IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (*Currently Amended*) A piezo actuating system for moving an object, comprising:

~~a plurality of~~ at least two piezo actuators, each of said at least two piezo actuators configured to lengthen or contract in response to a first control signal and to shear in a first direction or in a second direction opposite to said first direction in response to a second control signal; and

a control system for controlling said piezo actuators by supplying said first and second control signals;

wherein the system achieves the movement of said object by performing at least a linear shear sequence and a shuffle sequence, such that:

(a) said linear shear sequence moves said object by having each of said at least two piezo actuators (i) engage ~~including engaging~~ said object ~~using at least one of said piezo actuators~~ and ~~moving said object by shearing~~ and (ii) shear ~~said at least one piezo actuator~~ from a first position to a second position along ~~in~~ a first direction, and

(b) ~~wherein~~ said shuffle sequence returns each of the at least two piezo actuators to the first position after moving said object by ~~includes~~ (i) releasing the engagement of ~~a first~~ one of the at least two piezo ~~actuator~~ actuators with said object while maintaining the other of the at least two piezo actuators engaged with said object, (ii) changing a shear state of said ~~first~~ one piezo actuator by shearing ~~said first piezo actuator~~ in a second direction ~~an~~ opposite to said first direction, and (iii) engaging the object again using said ~~first~~ one piezo actuator.

2. (*Currently Amended*) The system according to claim 1, wherein ~~a second piezo actuator keeps said object engaged while said first piezo actuator releases engagement, and~~ said other of the at least two piezo actuators ~~second piezo actuator~~ performs said shuffle

sequence after said ~~first~~ one piezo actuator performs the shuffle sequence as ~~while~~ said ~~first~~ one piezo actuator has said object engaged.

3. (*Currently Amended*) The system according to claim 1, wherein ~~a piezo actuator~~ each of the at least two piezo actuators is formed by two piezo sub-actuators positioned opposite to each other and said object is engaged through clamping said object between the two piezo sub-actuators.

4. (*Original*) The system according to claim 1, wherein the system is configured to alternate said linear shear sequence and said shuffle sequence to extend a range for moving said object.

5. (*Original*) The system according to claim 1, wherein said control system comprises a position controller and a shuffle controller for switching between said linear shear sequence and said shuffle sequence by supplying a shuffle event signal to said position controller and outputting said first and second control signals to each piezo actuator.

6. (*Original*) The system according to claim 5, wherein said shuffle controller comprises a shuffle arbiter that determines when a shuffle sequence is to be performed and a profile generator that generates the first and second control signals and the shuffle event signal.

7. (*Original*) The system according to claim 2, wherein the system is further configured to perform a slow shuffle sequence wherein said shuffle sequence is performed relatively slowly, and during which said linear shear sequence may be performed simultaneously.

8. (*Original*) The system according to claim 7, wherein the control system comprises an integrator having a control force signal as an input, said integrator being reset in response to a shuffle start control signal, and an output of said integrator being added to said second control signal.

9. (*Currently Amended*) A lithographic apparatus comprising:

an illumination system for providing a beam of radiation;

a support structure for supporting a patterning device that serves to impart said beam of radiation with a pattern in its cross-section;

a substrate holder for holding a substrate;

a projection system for projecting said patterned beam onto a target portion of the substrate; and

a piezo actuating system for moving a component of said lithographic apparatus, said piezo actuating system including:

~~a plurality of~~ at least two piezo actuators, each of said at least two piezo actuators configured to lengthen or contract in response to a first control signal and to shear in a first direction or in a second direction opposite to said first direction in response to a second control signal; and

a control system for controlling said piezo actuators by supplying said first and second control signals;

wherein the system achieves the movement of said object by performing at least a linear shear sequence and a shuffle sequence, such that:

(a) said linear shear sequence moves said object by having each of said at least two piezo actuators (i) engage ~~including engaging~~ said object ~~using at least one of said piezo actuators~~ and ~~moving said object by shearing~~ and (ii) shear ~~said at least one piezo actuator~~ from a first position to a second position along ~~in~~ a first direction, and

(b) ~~wherein~~ said shuffle sequence returns each of the at least two piezo actuators to the first position after moving said object by ~~includes~~ (i) releasing the engagement of ~~a first~~ one of the at least two piezo ~~actuator~~ actuators with said object while maintaining the other of the at least two piezo actuators engaged with said object, (ii) changing a shear state of said ~~first~~ one piezo actuator by shearing ~~said first piezo actuator~~ in a second direction ~~an~~ opposite to said first direction, and (iii) engaging the object again using said ~~first~~ one piezo actuator.

10. (*Currently Amended*) The apparatus according to claim 9, wherein ~~a second piezo actuator keeps said object engaged while said first piezo actuator releases engagement, and~~ said other of the at least two piezo actuators ~~second piezo actuator~~ performs said shuffle

sequence after said ~~first~~ one piezo actuator performs the shuffle sequence as ~~while~~ said ~~first~~ one piezo actuator has said object engaged.

11. (*Currently Amended*) The apparatus according to claim 9, wherein ~~a piezo actuator is~~ said piezo actuators are formed by two piezo sub-actuators positioned opposite to each other and said object is engaged through clamping said object between the two piezo sub-actuators.

12. (*Original*) The apparatus according to claim 9, wherein the system is configured to alternate said linear shear sequence and said shuffle sequence to extend a range for moving said object.

13. (*Original*) The apparatus according to claim 9, wherein said control system comprises a position controller and a shuffle controller for switching between said linear shear sequence and said shuffle sequence by supplying a shuffle event signal to said position controller and outputting said first and second control signals to each piezo actuator.

14. (*Original*) The apparatus according to claim 13, wherein said shuffle controller comprises a shuffle arbiter that determines when a shuffle sequence is to be performed and a profile generator that generates the first and second control signals and the shuffle event signal.

15. (*Original*) The apparatus according to claim 10, wherein the system is further configured to perform a slow shuffle sequence wherein said shuffle sequence is performed relatively slowly, and during which said linear shear sequence may be performed simultaneously.

16. (*Original*) The apparatus according to claim 15, wherein the control system comprises an integrator having a control force signal as an input, said integrator being reset in response to a shuffle start control signal, and an output of said integrator being added to said second control signal.

17. (*Currently Amended*) A method for moving an object using ~~a number of~~ at least two piezo actuators, the piezo actuators being adapted for lengthening or contracting in response to a first control signal, and for shearing in two opposite directions in response to a second control signal, the method comprising:

(a) performing a linear shear sequence to move said object by having each of said at least two piezo actuators (i) ~~including engaging~~ engage said object ~~using at least one piezo actuator~~ and (ii) shear from a first position to a second position along a first direction ~~moving said object by shearing said at least one piezo actuator in one of said two directions~~; and

(b) performing a shuffle sequence to return at least one of the piezo actuators to the first position after moving said object by ~~including~~ releasing the engagement of one of said piezo actuators with said object ~~of a first piezo actuator~~ while maintaining the other of the piezo actuators engaged with said object, (ii) changing a shear state of said ~~first~~ one piezo actuator by shearing said first piezo actuator ~~into~~ an opposite direction from said first direction, and (iii) engaging said object again using said ~~first~~ one piezo actuator.

18. (*Currently Amended*) The method according to claim 17, wherein ~~a second piezo actuator keeps engaging the object,~~ while the ~~first~~ one piezo actuator releases its engagement, ~~and~~ said ~~second~~ other piezo actuator performs said shuffle sequence after said ~~first~~ one piezo actuator~~, while~~ as said first piezo actuator keeps engaging said object.

19. (*Original*) The method according to claim 17, further including alternating said linear shear sequence and said shuffle sequence to extend a range for moving said object.

20. (*Original*) The method according to claim 19, further including performing a slow shuffle sequence wherein said shuffle sequence is performed relatively slowly, and during which said linear shear sequence may be performed simultaneously.

21. (*Currently Amended*) A device manufacturing method employing a lithographic apparatus comprising:

providing an illumination system for providing a beam of radiation;

providing a support structure for supporting a patterning device that serves to impart said beam of radiation with a pattern in its cross-section;

providing a substrate holder for holding a substrate;

providing a projection system for projecting said patterned beam onto a target portion of the substrate; and

moving a component of said lithographic apparatus by using ~~a number of~~ at least two of piezo actuators, said piezo actuators being adapted for lengthening or contracting in response to a first control signal and for shearing in two opposite directions in response to a second control signal, said movement of component comprising:

(a) performing a linear shear sequence to move said object by having each of said at least two piezo actuators (i) ~~including engaging~~ engage said object ~~using at least one piezo actuator~~ and (ii) shear from a first position to a second position along a first direction ~~moving said object by shearing said at least one piezo actuator in one of said two directions~~; and

(b) performing a shuffle sequence to return at least one of the piezo actuators to the first position after moving said object by ~~including~~ releasing the engagement of one of said piezo actuators with said object ~~of a first piezo actuator~~ while maintaining the other of the piezo actuators engaged with said object, (ii) changing a shear state of said ~~first~~ one piezo actuator by shearing said first piezo actuator ~~into~~ an opposite direction from said first direction, and (iii) engaging said object again using said ~~first~~ one piezo actuator.

22. (*Currently Amended*) The device manufacturing method according to claim 21, wherein ~~a second piezo actuator keeps engaging the object,~~ while the ~~first~~ one piezo actuator releases its engagement, ~~and~~ said ~~second~~ other piezo actuator performs said shuffle sequence after said ~~first~~ one piezo actuator~~, while~~ as said first piezo actuator keeps engaging said object.

23. (*Original*)The device manufacturing method according to claim 21, further including alternating said linear shear sequence and said shuffle sequence to extend a range for moving said object.

24. (*Original*) The device manufacturing method according to claim 23, further including performing a slow shuffle sequence wherein said shuffle sequence is performed relatively slowly, and during which said linear shear sequence may be performed simultaneously.

25. (*New*) A piezo actuating system for moving an object, comprising

a plurality of piezo actuators, each of said piezo actuators configured to lengthen or contract in response to a first control signal and to shear in a first direction or in a second direction opposite to said first direction in response to a second control signal; and

a control system for controlling said piezo actuators by supplying said first and second control signals;

wherein the system achieves the movement of said object by performing at least a linear shear sequence and a shuffle sequence, said linear shear sequence including engaging said object using at least one of said piezo actuators and moving said object by shearing said at least one piezo actuator in a first direction,

wherein said shuffle sequence includes releasing the engagement of a first piezo actuator with said object, changing a shear state of said first piezo actuator by shearing said first piezo actuator in an opposite direction, and engaging the object again using said first piezo actuator, and

wherein said control system comprises a position controller and a shuffle controller for switching between said linear shear sequence and said shuffle sequence by supplying a shuffle event signal to said position controller and outputting said first and second control signals to each piezo actuator.

26. (*New*) A lithographic apparatus comprising:

an illumination system for providing a beam of radiation;

a support structure for supporting a patterning device that serves to impart said beam of radiation with a pattern in its cross-section;

a substrate holder for holding a substrate;

a projection system for projecting said patterned beam onto a target portion of the substrate; and

a piezo actuating system for moving a component of said lithographic apparatus, said piezo actuating system including:

a plurality of piezo actuators, each of said piezo actuators configured to lengthen or contract in response to a first control signal and to shear in a first direction or in a second direction opposite to said first direction in response to a second control signal; and

a control system for controlling said piezo actuators by supplying said first and second control signals;

wherein the system achieves the movement of said object by performing at least a linear shear sequence and a shuffle sequence, said linear shear sequence including engaging said object using at least one of said piezo actuators and moving said object by shearing said at least one piezo actuator in a first direction,

wherein said shuffle sequence includes releasing the engagement of a first piezo actuator with said object, changing a shear state of said first piezo actuator by shearing said first piezo actuator in an opposite direction, and engaging the object again using said first piezo actuator, and

wherein said control system comprises a position controller and a shuffle controller for switching between said linear shear sequence and said shuffle sequence by supplying a shuffle event signal to said position controller and outputting said first and second control signals to each piezo actuator.